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WHITE SANDS MISSILE RANGE, NEW MEXICO.

DR-409  
March 1969

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METEOROLOGICAL DATA REPORT

NIKE-HYDAC STV-82  
(4 February 1969)

AND

NIKE-HYDAC STV-83  
(4 February 1969)

BY

GORDON L. DUNASAY

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WHITE SANDS MISSILE RANGE, NEW MEXICO

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METEOROLOGICAL DATA REPORT

NIKE-HYDAC STV-82  
(4 February 1969)

And

NIKE-HYDAC STV-83  
(4 February 1969)

By

Gordon L. Dunaway

DR-409

March 1969

DA Task 1T665702D127-02

ATMOSPHERIC SCIENCES OFFICE  
WHITE SANDS MISSILE RANGE, NEW MEXICO

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ABSTRACT

Meteorological data gathered for the launching of two Nike-Hydac Missiles, STV-82 and STV-83, are presented for the Space and Missile Systems Organization, Holloman Air Force Base, New Mexico, and for ballistic studies. The data appear, along with calculated ballistic data, in tabular form.

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## INTRODUCTION

Nike-Hydac STV-82 was launched from Launch Complex 33, L-361, White Sands Missile Range (WSMR), New Mexico, at 0811 hours MST, 4 February 1969.

Nike-Hydac STV-83 was launched from Launch Complex 33, L-314, WSMR, New Mexico, at 0900 hours MST, 4 February 1969.

Meteorological data used in conjunction with theoretical calculations to predict rocket impact were collected by the Meteorological Support Technical Area, Atmospheric Sciences Office (ASO), WSMR, New Mexico. The Ballistics Meteorologist for these firings was Gordon L. Dunaway.

## DISCUSSION

Wind data for the first 216 feet above the surface were obtained from a system composed of five Aerovanes mounted on a 200-foot tower and cabled to component wind indicators.

From 216 to 4,160 feet above the surface, wind data were obtained from T-9 Radar-tracked balloon ascents.

Temperature, pressure and humidity data, along with upper wind data from 4,160 to 100,000 feet above the surface, were obtained from standard rawinsonde observations.

Mean wind component values in each ballistic zone were determined from vertical cross sections by the equal-area method.

Theoretical rocket performance values and ballistic factors as a function of altitude were provided by ASO and are the basis for data appearing in Tables I and II.

PAYOUT		305	Pounds
CORIOLIS DISPLACEMENT	WEST	3.8	Miles
SECOND-STAGE IGNITION	TIME	20.0	Seconds
PEAK	ALTITUDE	35,000	Feet MSL
	TIME	205	Seconds
	ALTITUDE	555,000	Feet MSL
UNIT WIND EFFECT	HEAD	2.446	Miles/MPH
	CROSS	2.457	Miles/MPH
	TAIL	2.372	Miles/MPH
TOWER TILT EFFECT		11.5	Miles/Degree

TABLE I. THEORETICAL ROCKET PERFORMANCE VALUES  
NIKE-HYDAC STV-82

PAYOUT		220	Pounds.
CORIOLIS DISPLACEMENT	WEST	4.9	Miles
SECOND-STAGE IGNITION	TIME	20.0	Seconds
PEAK	ALTITUDE	35,760	Feet MSL
	TIME	236	Seconds
	ALTITUDE	716,000	Feet MSL
UNIT WIND EFFECT	HEAD	2.158	Miles/MPH
	CROSS	2.244	Miles/MPH
	TAIL	2.167	Miles/MPH
TOWER TILT EFFECT		14.53	Miles/Degrees

TABLE II. THEORETICAL ROCKET PERFORMANCE VALUES  
NIKE-HYDAC STV-83

LAYERS IN FEET ABOVE GROUND	BALLISTIC FACTORS
9- 60	.1661
60- 108	.0971
108- 148	.0791
148- 184	.0599
184- 216	.0142
216- 300	.0802
300- 400	.0656
400- 600	.0558
600- 800	.0562
800-1000	.0412

LAYERS IN FEET ABOVE GROUND	BALLISTIC FACTORS
1000- 1400	.0531
1400- 2000	.0502
2000- 2500	.0289
2500- 3000	.0167
3000- 3500	.0075
3500- 4100	.0035
4100-11000	-.0159
11000-16000	-.0110
16000-21000	-.0104
21000-26000	-.0097

LAYERS IN FEET ABOVE GROUND	BALLISTIC FACTORS
26000-31000	-.0062
31000-34000	.0794
34000-36000	.0281
36000-41000	.0346
41000-46000	.0137

TABLE III. BALLISTIC FACTORS  
NIKE-HYDAC STV-82

LAYERS IN FEET ABOVE GROUND	BALLISTIC FACTORS
15- 60	.135
60-108	.075
108-148	.070
148-184	.031
184-216	.029
216-300	.052
300-400	.048
400-600	.082
600-800	.058

LAYERS IN FEET ABOVE GROUND	BALLISTIC FACTORS
800- 1000	.039
1300- 1400	.071
1400- 2000	.065
2000- 2500	.031
2500- 3000	.027
3000-- 3500	.010
3500- 4160	.009
4160-11000	-.024
11000-16000	-.018

LAYERS IN FEET ABOVE GROUND	BALLISTIC FACTORS
16000-21000	-.018
21000-26000	-.012
26000-31770	-.012
31770-36000	.132
36000-41000	.058
41000-46000	.032
46000-56000	.018
56000-66000	.011
66000-73300	.001

TABLE IV. BALLISTIC FACTORS  
NIKE-HYDAC STV-83

AERO-VANE NO. *	MEAN WIND COMPONENTS IN MILES PER HOUR									
	1 0600 MST		2 0630 MST		3 0700 MST		4 0715 MST		5 0730 MST	
	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W
1	2.0N	2.0W	2.0N	1.0W	1.0N	1.0W	1.0N	1.0W	3.0W	0.0
2	5.0	2.0E	5.0	2.0E	3.0	3.0E	2.0	1.0E	2.0	1.0N
3	8.0	4.0	9.0	5.0	7.0	6.0	6.0	4.0	5.0	3.0E
4	12.0	5.0	14.0	3.0	11.0	7.0	9.0	5.0	8.0	6.0
5	12.0	3.0	13.0	2.0	11.0	6.0	9.0	4.0	8.0	6.0

AERO-VANE NO. *	MEAN WIND COMPONENTS IN MILES PER HOUR									
	6 0800 MST		7 0811 MST		8 0820 MST		9 0830 MST		10 0845 MST	
	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W
1	0.0	0.0	0.0	0.0	0.0	0.0	2.0N	0.0	3.0N	1.0E
2	3.0N	0.0	3.0N	1.0E	2.0N	0.0	2.0	1.0E	3.0	2.0
3	6.0	3.0E	6.0	2.0	4.0	1.0E	5.0	4.0	6.0	2.0
4	9.0	4.0	10.0	3.0	8.0	1.0	9.0	2.0	8.0	4.0
5	9.0	3.0	10.0	3.0	9.0	2.0	10.0	3.0	11.0	3.0

TABLE V. ANEMOMETER WIND SPEED AND DIRECTION  
NIKE-HYDAC STV-82 and STV-83

\* Heights corresponding to Aerovane Numbers: 1 = 35 Feet 3 = 128 Feet 5 = 200 Feet  
2 = 88 Feet 4 = 168 Feet

LAYERS IN FEET ABOVE GROUND	MEAN WIND COMPONENTS IN MILES PER HOUR											
	1 0600 MST		2 0630 MST		3 0700 MST		4 0715 MST		5 0730 MST		6 0745 MST	
	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W
216- 300	9.5N	4.0E	12.5N	2.0E	9.5N	4.5E	8.0N	2.5E	7.5N	3.0E	6.5N	2.0E
300- 400	7.0	0.0	10.0	0.5	6.0	2.0	5.5	0.0	6.0	0.5	6.5	0.5
400- 600	2.5	2.5W	4.0	2.5W	2.5	1.5W	1.5	2.0W	1.5	2.5W	3.0	2.5W
600- 800	3.5	6.0	1.0	3.5	0.5	1.5	0.0	1.0	1.0	1.5	0.5	1.0
800-1000	2.5	5.5E	1.0S	2.5	0.0	1.5E	1.0S	1.0E	0.5S	1.5E	2.0S	1.0S
1000-1400	0.5S	7.5	0.5N	6.0E	0.5S	6.0	2.0	4.5	1.5	5.5	4.5	2.0
1400-2000	6.0	9.5	4.5S	7.5	5.5	8.5	7.0	8.0	7.0	7.5	8.0	6.5
2000-2500	7.5	13.0	9.0	12.5	13.0	13.0	12.5	12.0	0.0	12.5	13.0	9.5
2500-3000	8.0	15.0	11.0	12.5	12.5	13.5	13.0	10.5	12.5	8.0	14.0	7.0
3000-3500	9.0	13.5	13.0	11.5	15.0	9.0	16.5	9.5	16.0	9.5	17.0	10.5
3500-4100	15.0	10.0	19.0	10.0	17.0	9.0	17.0	7.5	17.0	7.5	19.0	6.5

TABLE VI. PILOT-BALLOON-MEASURED WIND DATA  
NIKE-HYDAC STV-82 and STV-83

LAYERS IN FEET ABOVE GROUND	MEAN WIND COMPONENTS IN MILES PER HOUR										
	0811 MST			0820 MST			0830 MST			0845 MST	
	N-S	E-W	N-S	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W
216- 300	9.3N	2.0E	7.5N	2.0E	9.5N	2.0E	9.5N	2.0E	9.5N	2.0E	7.5N
300- 400	7.0	0.5	6.5	1.5	8.0	1.5	7.0	1.5	7.5	1.5	6.5
400- 600	3.0	1.5W	3.0	0.0	3.5	0.5W	3.5	1.0W	4.0	0.5	4.0
600- 800	2.0	0.5	1.5	0.0	2.0	1.5W	1.5	0.5W	4.0	2.0	2.5
800-1,000	0.5	2.0E	0.0	1.0E	1.0	5.5	1.5	2.5	3.0	3.0	2.5
1000-1,400	2.0S	6.0	1.5S	6.5	1.5S	2.5	2.0S	3.0	0.5	5.5	0.5S
1400-2000	8.0	3.5	7.0	2.5	6.0	7.5	6.5	3.0	5.0S	3.5	5.5
2000-2500	10.5	4.0	10.0	6.5	7.5	11.5	6.0	9.0	5.5	9.5	7.0
2500-3000	14.5	9.5	13.0	11.0	12.0	9.0	12.0	10.0	11.5	10.0	12.5
3000-3500	18.0	9.5	16.0	10.0	14.0	8.0	14.0	7.5	15.0	7.0	16.0
3500-4160	20.0	6.0	19.5	7.0	18.5	7.0	19.5	4.5	19.0	4.0	18.5
											4.5

TABLE VI. PILOT-BALLOON-MEASURED WIND DATA (CONT)  
NIKE-HYDAC STV-82 and STV-83

LAYERS IN FEET ABOVE GROUND	MEAN WIND COMPONENTS IN KNOTS					
	1 0500 MST		2 0800 MST			
	N-S	E-W	N-S	E-W	N-S	E-W
4100-11000	13.5S	4.0W	15.5S	13.0W		
11000-16000	13.5	23.5	14.5	25.0		
16000-21000	12.5	35.0	11.0	30.0		
21000-26000	9.0	50.0	17.5	48.0		
26000-31000	20.5	56.5	19.5	53.5		
31000-34000	21.0	58.5	23.5	65.0		
34000-36000	22.0	61.0	7.5	40.5		
36000-41000	12.0	68.0	13.5	78.0		
41000-46000	12.5	71.0	12.0	68.0		
46000-51000	12.0	68.0	19.0	51.5		
51000-56000	0.0	48.0	16.5	45.0		
56000-61000	0.0	37.0	0.0	42.0		
61000-67300	0.0	41.0	12.5N	35.0		

TABLE VII. RAWINSONDE-MEASURED WIND DATA  
NIKE-HYDAC STV-82

LAYERS IN FEET ABOVE GROUND	MEAN WIND COMPONENTS IN KNOTS					
	1 0800 MST		N-S	E-W	N-S	
	N-S	E-W	N-S	E-W	N-S	E-W
4160-11000	15.58	13.0W				
11000-16000	14.5	25.0				
16000-21000	11.0	30.0				
21000-26000	17.5	48.0				
26000-31770	19.5	53.5				
31770-36000	15.5	53.0				
36000-41000	13.5	78.0				
41000-46000	12.0	68.0				
46000-56000	18.0	48.5				
56000-66000	6.0N	39.0				
66000-73300	12.5	34.0				

TABLE VIII. RAW IN SONDÉ-MEASURED WIND DATA  
NIKE-HYDAC STV-83

STATION ALTITUDE 3989.0 FEET MSL  
 4 FEB. 69 0500 HRS MST  
 ASCENSION NO. 118

SIGNIFICANT LEVEL DATA  
 0658003905  
 WHITE SANDS SITE

WSTM SITE COORDINATES  
 E 488, 580 FEET  
 N 185, 045 FEET

TABLE IX

PRESSURE MILLIBARS MSL	GEOMETRIC ALTITUDE FEET	TEMPERATURE AIR DEGREES CENTIGRADE	REL.HUM. PERCENT
886.3	3989.0	-2.0	-10.1
876.0	4297.3	3.7	-13.2
858.0	4851.5	4.5	-12.5
762.0	8005.8	1.4	-11.7
751.0	8390.8	2.0	-9.3
714.0	9728.1	1.0	-6.8
702.0	10175.4	0.2	-5.6
681.0	10974.1	-0.9	-12.2
608.0	13914.0	-7.0	-26.3
598.0	14339.2	-6.8	-28.5
496.0	19059.9	-15.2	-34.3
421.0	23056.1	-25.0	-37.0
405.0	23978.4	-27.3	-31.6
395.0	24569.6	-28.3	-32.1
290.0	31604.0	-45.6	-49.8
213.0	38105.5	-63.7	0.
198.0	39579.8	-64.1	0.
188.0	40636.0	-59.8	0.
158.0	44236.2	-57.3	0.
142.0	46456.4	-58.2	0.
130.0	48272.2	-62.1	0.
111.0	51491.9	-62.2	0.
93.0	55041.9	-68.7	0.
87.0	56357.0	-69.5	0.
80.0	57997.0	-72.2	0.
61.0	63307.3	-68.9	0.
40.0	71749.3	-63.7	0.
34.0	75077.0	-59.5	0.
26.0	80615.8	-60.3	0.

\*\* RELATIVE HUMIDITY NOT SUPPLIED. ZERO VALUE ASSUMED FOR COMPUTATIONS.

STATION ALTITUDE 3989.0 FEET MSL  
4 FEB. 69 0500 HRS MST  
ASCENSION NO. 118

UPPER AIR DATA  
0658003905  
WHITE SANDS SITE

WSTM SITE COORDINATES  
E 488, 580 FEET  
N 185, 045 FEET

TABLE X

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREES	TEMPERATURE DEPOINT CENTIGRADE	REL. HUM. PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	DIRECTION DEGREES(1N) KNOTS	WIND DATA SPEED KNOTS	INDEX OF REFRACTION
3989.0	886.3	-2.0	-10.1	54.0	1137.5	641.6	0.	0.	1.000268
4000.0	885.9	-1.8	-10.1	53.1	1136.2	641.8	0.7	0.1	1.000268
4500.0	869.4	4.0	-12.9	28.0	1091.9	648.5	30.5	2.4	1.000254
5000.0	853.2	4.4	-12.4	28.4	1070.1	649.0	60.2	4.8	1.000250
5500.0	837.3	3.9	-12.2	29.9	1052.0	648.4	90.0	7.1	1.000246
6000.0	821.7	3.4	-12.1	31.3	1034.2	647.9	119.8	9.5	1.000242
6500.0	806.4	2.9	-12.0	32.7	1016.7	647.3	137.9	11.2	1.000239
7000.0	791.4	2.4	-11.9	34.1	999.5	646.7	142.4	12.1	1.000235
7500.0	776.6	1.9	-11.8	35.6	982.6	646.2	147.6	12.8	1.000231
8000.0	762.2	1.4	-11.7	37.0	966.0	645.6	153.3	13.5	1.000228
8500.0	747.9	1.9	-9.1	44.1	945.9	646.3	158.4	15.1	1.000226
9000.0	733.9	1.5	-8.1	48.9	929.3	645.9	163.3	17.0	1.000224
9500.0	720.2	1.2	-7.2	53.8	913.0	645.5	169.3	17.7	1.000221
10000.0	706.7	0.5	-6.1	61.5	897.8	644.8	175.4	18.2	1.000220
10500.0	693.4	-0.2	-8.1	55.7	883.6	643.8	182.0	17.2	1.000214
11000.0	680.3	-1.0	-12.4	41.8	869.7	642.8	189.5	16.2	1.000206
11500.0	667.3	-2.0	-14.4	38.1	856.5	641.5	200.7	15.1	1.000201
12000.0	654.6	-3.0	-16.6	34.3	845.5	640.3	211.9	14.2	1.000197
12500.0	642.1	-4.1	-18.9	30.6	830.7	639.0	223.6	14.2	1.000192
13000.0	629.3	-5.1	-21.3	26.8	818.1	637.7	233.1	14.3	1.000188
13500.0	617.8	-6.1	-23.9	23.1	805.7	636.4	236.5	15.2	1.000184
14000.0	606.0	-7.0	-26.7	19.2	792.8	635.4	238.3	16.5	1.000180
14500.0	594.2	-7.1	-28.7	16.1	777.8	635.2	237.0	18.7	1.000176
15000.0	582.5	-8.0	-29.3	16.3	765.1	634.2	236.4	20.7	1.000173
15500.0	571.1	-8.9	-29.9	16.5	752.7	633.1	236.3	22.5	1.000170
16000.0	559.9	-9.8	-30.5	16.7	740.4	632.0	238.6	24.4	1.000168
16500.0	548.9	-10.6	-31.1	16.9	728.4	631.0	242.1	26.4	1.000165
17000.0	538.2	-11.5	-31.7	17.1	716.5	629.9	245.0	28.3	1.000162
17500.0	527.6	-12.4	-32.3	17.3	704.9	628.8	247.7	30.0	1.000159
18000.0	517.3	-13.3	-33.0	17.6	693.4	627.7	247.3	31.2	1.000157

STATION ALTITUDE 3989.0 FEET MSL  
4 FEB. 69 0500 HRS MST  
ASCENSION NO. 118

UPPER AIR DATA  
0658003905  
WHITE SANDS SITE

WSTM SITE COORDINATES  
E 488, 580 FEET  
N 185, 045 FEET

TABLE X (Cont)

GEOMETRIC ALTITUDE MSL, FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREE CENTIGRADE	REL. HUM. PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND IN KNOTS	WIND DIRECTION DEGREES (TN) KNOTS	INDEX OF REFRACTION
18500.0	507.1	-14.2	-33.6	17.8	682.2	626.7	1.000154
19000.0	497.2	-15.1	-34.2	18.0	671.1	625.6	1.000151
19500.0	487.1	-16.3	-34.4	19.5	660.6	624.1	1.000149
20000.0	477.2	-17.5	-34.5	21.3	650.3	622.7	1.000147
20500.0	467.5	-18.7	-34.8	23.0	640.1	621.2	1.000144
21000.0	458.1	-20.0	-35.1	24.8	630.2	619.7	1.000142
21500.0	448.8	-21.2	-35.5	26.5	620.4	618.2	1.000140
22000.0	439.6	-22.4	-36.0	28.3	610.8	616.6	1.000138
22500.0	430.7	-23.6	-36.4	30.1	601.3	615.1	1.000136
23000.0	422.0	-24.1	-37.0	31.8	592.0	613.6	1.000133
23500.0	413.2	-26.1	-33.7	49.3	582.6	612.1	1.000132
24000.0	404.6	-27.3	-31.6	68.1	573.3	610.6	1.000130
24500.0	396.2	-28.2	-32.0	70.6	563.2	609.6	1.000128
25000.0	387.6	-29.4	-33.2	70.0	553.7	608.1	1.000126
25500.0	379.2	-30.6	-34.4	70.1	544.5	606.5	1.000123
26000.0	370.9	-31.8	-35.7	69.6	535.4	605.0	1.000121
26500.0	362.9	-33.0	-37.0	69.1	526.4	603.4	1.000119
27000.0	355.0	-34.3	-38.2	68.6	517.7	601.9	1.000117
27500.0	347.3	-35.5	-39.5	68.1	509.1	609.3	1.000115
28000.0	339.7	-36.7	-40.7	67.6	500.6	598.8	1.000113
28500.0	332.4	-38.0	-42.0	67.1	492.3	597.2	1.000111
29000.0	325.1	-39.2	-43.3	66.6	484.1	595.6	1.000109
29500.0	318.1	-40.4	-44.5	66.1	476.1	594.0	1.000107
30000.0	311.2	-41.7	-45.8	65.6	468.3	592.5	1.000105
30500.0	304.4	-42.9	-47.0	65.1	460.6	590.9	1.000103
31000.0	297.8	-44.1	-48.3	64.6	452.0	589.3	1.000101
31500.0	291.3	-45.3	-49.5	64.1	445.5	587.7	1.000100
32000.0	284.6	-46.7	-51.4	60.1**	437.9	586.0	1.000098
32500.0	277.9	-48.1	-53.4	55.2**	430.2	584.2	1.000096
33000.0	271.4	-49.5	-55.5	50.3**	422.8	582.3	1.000094

\*\* AT LEAST ONE ASSURED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION

STATION ALTITUDE 3989.0 FEET MSE  
4 FEB. 69 0500-HRS MST  
ASCENSION NO.: 116

UPPER AIR DATA  
0658003905  
WHITE SANDS SITE

MSFM SITE COORDINATES  
E 488.580 FEET  
N 155.045 FEET

TABLE X (Cont.)

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE			REL. HUM. PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DIRECTION DEGREES (TN) KNOTS	INDEX OF REFRACTION
		AIR DEGREES	DEGREES CENTIGRADE	DEGREES					
33500.0	265.0	-50.9	-57.6	-5	45.3**	415.4*	580.5	247.8	62.1
34000.0	258.8	-52.3	-59.8	-4	40.4**	408.3	578.7	246.6	63.1
34500.0	252.8	-53.7	-62.1	-3	35.5**	401.2	576.9	246.0	62.5
35000.0	246.8	-55.1	-64.5	-2	30.6**	394.3	575.0	245.6	61.7
35500.0	241.0	-56.4	-67.0	-1	25.6**	387.5	573.2	244.9	62.5
36000.0	235.4	-57.8	-69.7	0	20.7**	380.9	571.4	244.2	63.5
36500.0	229.9	-59.2	-72.8	1	15.8**	374.4	569.5	243.8	63.1
37000.0	224.5	-60.6	-76.4	2	10.9**	368.0	567.7	243.5	62.3
37500.0	219.2	-62.0	-81.2	3	6.0**	361.7	555.8	244.5	62.0
38000.0	214.1	-63.4	-92.0	4	1.0**	355.6	553.9	246.2	61.9
38500.0	208.9	-63.8	0	5	-0.**	347.6	563.4	248.0	61.9
39000.0	203.8	-63.9	0	6	-0.**	339.4	563.2	250.2	62.1
39500.0	198.8	-64.1	0	7	-0.**	331.3	563.0	252.5	62.2
40000.0	194.0	-62.4	0	8	-0.**	320.6	565.3	255.0	62.5
40500.0	189.3	-60.4	0	9	-0.**	309.9	568.0	257.6	62.7
41000.0	184.7	-59.5	0	10	-0.**	301.3	569.1	258.2	64.3
41500.0	180.3	-59.2	0	11	-0.**	293.6	569.5	259.7	65.9
42000.0	176.0	-58.9	0	12	-0.**	286.2	570.0	259.0	67.7
42500.0	171.8	-58.5	0	13	-0.**	278.9	570.5	259.3	69.5
43000.0	167.7	-58.2	0	14	-0.**	271.8	570.9	259.8	72.1
43500.0	163.7	-57.8	0	15	-0.**	264.9	571.4	260.4	75.2
44000.0	159.8	-57.5	0	16	-0.**	258.2	571.9	261.1	77.6
44500.0	156.0	-57.4	0	17	-0.**	251.9	571.9	261.7	78.6
45000.0	152.3	-57.6	0	18	-0.**	246.2	571.7	262.4	79.6
45500.0	148.7	-57.8	0	19	-0.**	240.6	571.4	263.1	77.4
46000.0	145.2	-58.0	0	20	-0.**	235.1	571.1	263.8	75.1
46500.0	141.7	-58.3	0	21	-0.**	229.8	570.8	262.9	71.6
47000.0	138.3	-59.4	0	22	-0.**	225.4	569.3	261.4	67.6
47500.0	135.0	-60.4	0	23	-0.**	221.1	567.9	260.2	64.8
48000.0	131.7	-61.5	0	24	-0.**	216.9	566.5	259.6	64.3

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL  
4 FEB. 65 0500 HRS MST  
ASCENSION NO. 118

UPPER AIR DATA  
0658003905  
WHITE SANDS SITE

WSTM SITE COORD  
E 488.581  
N 185.061

TABLE X (Cont.)

GEOMETRIC ALTITUDE MSL : FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEGREE CENTIGRADE	REL. HUM. PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DATA DIRECTION DEGREES (TN)	WIND SPEED KNOTS	INDEX OF REFRAC
48500.0	128.6	-62.1	0.	**	212.2	565.7	259.0	63.9
49000.0	125.4	-62.1	0.	0.	207.1	565.6	258.6	65.1
49500.0	122.4	-62.1	0.	**	202.1	565.6	258.4	66.7
50000.0	119.4	-62.2	0.	0.	197.2	565.6	258.2	68.5
50500.0	116.5	-62.2	0.	**	192.4	565.6	259.2	72.6
51000.0	113.7	-62.2	0.	**	187.8	565.6	260.2	76.7
51500.0	111.0	-62.2	0.	**	183.3	565.5	260.6	79.1
52000.0	108.2	-63.1	0.	0.	179.5	564.3	260.9	78.5
52500.0	105.6	-64.0	0.	**	175.9	563.1	260.9	78.0
53000.0	103.0	-65.0	0.	**	172.3	561.8	261.1	76.2
53500.0	100.4	-65.9	0.	0.	168.8	560.6	261.3	73.6
54000.0	98.0	-66.8	0.	**	165.4	559.3	261.6	71.0
54500.0	95.5	-67.7	0.	0.	162.0	558.1	262.6	67.3
55000.0	93.2	-68.6	0.	**	158.8	556.9	263.6	63.5
55500.0	90.9	-69.0	0.	0.	155.1	556.4	264.6	59.8
56000.0	88.6	-69.3	0.	0.	151.4	556.0	265.4	57.6
56500.0	86.4	-69.7	0.	0.	147.9	555.3	266.2	55.3
57000.0	84.2	-70.6	0.	0.	144.8	554.2	267.6	51.9
57500.0	82.1	-71.4	0.	0.	141.7	553.1	269.7	46.9
58000.0	80.0	-72.2	0.	0.	138.7	552.0	271.8	41.9
58500.0	78.0	-71.9	0.	0.	135.0	552.4	271.7	39.0
59000.0	76.0	-71.6	0.	0.	131.4	552.8	270.9	36.7
59500.0	74.1	-71.3	0.	0.	127.9	553.3	270.0	34.4
60000.0	72.2	-71.0	0.	0.	124.5	553.7	269.3	32.6
60500.0	70.4	-70.6	0.	0.	121.1	554.1	268.6	30.7
61000.0	68.6	-70.3	0.	0.	117.9	554.5	267.6	31.6
61500.0	66.9	-70.0	0.	0.	114.7	555.0	266.2	35.7
62000.0	65.2	-69.7	0.	0.	111.7	555.4	264.8	39.8
62500.0	63.6	-69.4	0.	0.	108.7	555.8	265.6	41.3
63000.0	62.0	-69.1	0.	0.	105.8	556.2	267.0	42.3

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3969.0 FEET  
4 FEB. 69 0500 HRS MST

ASCENSION NO. 1816  
03° 0' 0"  
02° 5' 0"  
02° 5' 0"  
03° 0' 0"

WHITE SANDS SITE  
COORDINATES 33° 48.8' N 102° 0' W  
ELEVATION 4888.380 FEET  
WIND VELOCITY 185.005 FEET

#### UPPER AIR DATA

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	AIR 3 DEGREES CENTIGRADE		DENSITY G/M CUBIC METERS	SOUND SPEED KNOTS	REFRACT INDEX	REFRACTION
		TEMPERATURE	HUMIDITY PERCENT				
63500.0	60.4	-68.8	0.6	0.6	305	1.000023	
64000.0	58.9	-68.5	0.6	0.6	305	1.000022	
64500.0	57.5	-68.2	0.6	0.6	305	1.000022	
65000.0	56.1	-67.9	0.6	0.6	305	1.000021	
65500.0	54.7	-67.5	0.6	0.6	305	1.000021	
66000.0	53.3	-67.2	0.6	0.6	305	1.000020	
66500.0	52.0	-66.9	0.6	0.6	305	1.000020	
67000.0	50.7	-66.6	0.6	0.6	305	1.000019	
67500.0	49.5	-66.3	0.6	0.6	305	1.000019	
68000.0	48.2	-66.0	0.6	0.6	305	1.000018	
68500.0	47.0	-65.7	0.6	0.6	305	1.000018	
69000.0	45.9	-65.4	0.6	0.6	305	1.000017	
69500.0	44.8	-65.1	0.6	0.6	305	1.000017	
70000.0	43.7	-64.8	0.6	0.6	305	1.000016	
70500.0	42.6	-64.5	0.6	0.6	305	1.000016	
71000.0	41.5	-64.2	0.6	0.6	305	1.000015	
71500.0	40.5	-63.9	0.6	0.6	305	1.000015	
72000.0	39.5	-63.4	0.6	0.6	305	1.000015	
72500.0	38.6	-62.8	0.6	0.6	305	1.000014	
73000.0	37.6	-62.1	0.6	0.6	305	1.000014	
73500.0	36.7	-61.5	0.6	0.6	305	1.000013	
74000.0	35.8	-60.9	0.6	0.6	305	1.000013	
74500.0	35.0	-60.2	0.6	0.6	305	1.000012	
75000.0	34.1	-59.6	0.6	0.6	305	1.000012	
75500.0	33.3	-59.6	0.6	0.6	305	1.000012	
76000.0	32.5	-59.6	0.6	0.6	305	1.000012	
76500.0	31.7	-59.7	0.6	0.6	305	1.000012	
77000.0	31.0	-59.8	0.6	0.6	305	1.000011	
77500.0	30.2	-59.8	0.6	0.6	305	1.000011	
78000.0	29.5	-59.9	0.6	0.6	305	1.000011	

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION

STATION ALTITUDE 3989.0 FEET MSL  
4 FEB. 69 0500 HRS MST  
ASCENSION NO. 118

UPPER AIR DATA  
0658003905  
WHITE SANDS SITE

WSTM SITE COORDINATES  
E 488, 580 FEET  
N 105, 045 FEET

TABLE X (Cont)

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEPOINT DEGREES CENTIGRADE	REL.HUM. PERCENT	SPEED OF SOUND GM/CUBIC METER KNOTS	WIND DATA DIRECTION DEGREES(TN)	SPEED KNOTS	INDEX OF REFRACTION
78500.0	28.8	-60.0	0.	-0. **	47.1	568.5	1.000010
79000.0	28.1	-60.1	0.	-0. **	46.0	568.4	1.000010
79500.0	27.4	-60.1	0.	-0. **	44.9	568.3	1.000010
80000.0	26.8	-60.2	0.	-0. **	43.8	568.2	1.000010
80500.0	26.1	-60.3	0.	-0. **	42.8	568.1	1.000010

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL  
4 FEB. 69. 0500 HRS. MST  
ASCENSION NO. : 118

MANDATORY LEVELS  
0658003905  
WHITE SANDS SITE

NSTM SITE COORDINATES  
N 35° 48.8' E 106° 52.0' FEET  
N 35° 48.8' E 106° 52.0' FEET

TABLE XII

PRESSURE, GEOPOTENTIAL, TEMPERATURE, REL.HUM., WIND DATA  
MILLIBARS FEET AIR DEWPOINT PERCENT DIRECTION SPEED  
DEGREES CENTIGRADE DEGREES(FTN) KNOTS

850.0	5100.	4.3	-12.4	29.	5.3
800.0	6714.	2.7	-11.9	33.	11.6
750.0	8422.	2.0	-9.2	43.	14.8
700.0	10244.	0.1	-6.2	63.	17.7
650.0	12181.	-3.4	-17.4	33.	216.3
600.0	14242.	-6.8	-28.0	17.	237.7
550.0	16454.	-10.6	-31.0	17.	237.7
500.0	18841.	-14.8	-34.0	16.	241.3
450.0	21426.	-21.6	-35.5	26.	241.3
400.0	24241.	-27.8	-31.8	69.	26.3
350.0	27345.	-35.1	-39.0	68.	245.7
300.0	30808.	-43.7	-47.8	65.	31.9
250.0	34737.	-54.3	-63.2	35.	42.1
200.0	39299.	-64.0	0.	-0.**	42.1
175.0	42026.	-58.8	0.	-0.**	251.7
150.0	45215.	-57.7	0.	-0.**	252.6
125.0	48951.	-62.1	0.	-0.**	245.6
100.0	53456.	-66.0	0.	-0.**	251.7
80.0	57830.	-72.2	0.	-0.**	259.1
70.0	60419.	-70.6	0.	-0.**	262.8
60.0	63434.	-68.7	0.	-0.**	258.6
50.0	67035.	-66.4	0.	-0.**	261.4
40.0	71437.	-63.7	0.	-0.**	274.5
30.0	71369.	-59.9	0.	-0.**	277.2
					41.9
					296.3
					29.0

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL  
4 FEB. 69 0800 HRS MST  
ASCENSION NO. 119

SIGNIFICANT LEVEL DATA  
0650003906  
WHITE SANDS SITE

WSTM SITE COORDINATES  
E 488.580 FEET  
N 185.045 FEET

TABLE XII

PRESSURE MILLIBARS	GEOMETRIC ALTITUDE FEET	TEMPERATURE AIR DEPOINT DEGREES CENTIGRADE	REL. HUM. PERCENT
887.3	3489.0	-3.0	42.0
873.0	4417.7	4.9	-12.6
781.0	7385.7	2.4	-9.5
731.0	9139.3	1.5	-8.3
716.0	9689.0	2.3	-6.1
709.0	9949.9	2.6	-11.7
653.0	12113.2	-3.1	-13.4
632.0	12960.5	-5.2	-14.1
579.0	15211.9	-7.4	-29.0
490.0	19397.9	-18.0	-33.3
475.0	20159.1	-10.0	-30.5
466.0	20625.3	-10.5	-26.4
432.0	22451.9	-25.4	-30.2
425.0	22841.7	-25.8	-30.6
417.0	23295.5	-25.0	-29.2
400.0	24287.2	-26.9	-31.5
321.0	29375.4	-39.5	-46.9
302.0	30738.9	-43.2	-50.2
254.0	34484.7	-54.2	-0.**
212.0	38217.0	-63.9	-0.**
188.0	40668.6	-59.4	-0.**
160.0	44018.5	-56.4	-0.**
120.0	49960.2	-62.0	-0.**
114.0	50657.6	-58.3	-0.**
79.0	58677.7	-69.6	-0.**
70.0	60826.3	-69.8	-0.**
24.0	82541.0	-56.5	-0.**
18.5	88055.1	-52.5	-0.**
11.5	98235.4	-52.0	-0.**
10.0	101261.5	-48.1	-0.**
6.4	111267.9	-36.2	-0.**

\*\* RELATIVE HUMIDITY NO. SUPPLIED. ZERO VALUE ASSUMED FOR COMPUTATIONS.

STATION ALTITUDE 3980.0 FRET-MSL  
4 FEB. 69 0000 HRS MST  
ASCENSION NO. 119

WSTM SITE COORDINATES  
N 101° 04' 00", E 087° 44' 00" FEET

3989.0	887.3	-3.6	0
4000.0	886.9	-2.8	
4500.0	870.3	-4.8	4.4
5000.0	854.1	-4.0	4.0
5500.0	838.3	-3.4	3.4
6000.0	822.7	-3.1	2.7
6500.0	807.4	-2.7	2.7
7000.0	792.4	-2.1	2.1
7500.0	777.6	-2.3	2.3
8000.0	763.1	-2.1	2.1
8500.0	748.9	-1.8	1.8
9000.0	734.9	-1.6	1.6
9500.0	721.1	-2.0	2.0
10000.0	707.7	-2.5	2.5
10500.0	694.3	-1.2	1.2
11000.0	681.2	-0.2	0.2
11500.0	668.4	-1.5	1.5
12000.0	655.8	-2.8	2.8
12500.0	642.3	-4.1	4.1
13000.0	631.0	-5.2	5.2
13500.0	618.9	-5.7	5.7
14000.0	607.0	-6.2	6.2
14500.0	595.3	-6.7	6.7
15000.0	583.9	-7.2	7.2
15500.0	572.4	-8.1	8.1
16000.0	561.1	-9.4	9.4
16500.0	550.0	-10.7	10.7
17000.0	539.2	-11.9	11.9
17500.0	528.5	-13.2	13.2
18000.0	518.1	-14.5	14.5
3989.0	887.3	-3.6	0
4000.0	886.9	-2.8	
4500.0	870.3	-4.8	4.4
5000.0	854.1	-4.0	4.0
5500.0	838.3	-3.4	3.4
6000.0	822.7	-3.1	2.7
6500.0	807.4	-2.7	2.7
7000.0	792.4	-2.1	2.1
7500.0	777.6	-2.3	2.3
8000.0	763.1	-2.1	2.1
8500.0	748.9	-1.8	1.8
9000.0	734.9	-1.6	1.6
9500.0	721.1	-2.0	2.0
10000.0	707.7	-2.5	2.5
10500.0	694.3	-1.2	1.2
11000.0	681.2	-0.2	0.2
11500.0	668.4	-1.5	1.5
12000.0	655.8	-2.8	2.8
12500.0	642.3	-4.1	4.1
13000.0	631.0	-5.2	5.2
13500.0	618.9	-5.7	5.7
14000.0	607.0	-6.2	6.2
14500.0	595.3	-6.7	6.7
15000.0	583.9	-7.2	7.2
15500.0	572.4	-8.1	8.1
16000.0	561.1	-9.4	9.4
16500.0	550.0	-10.7	10.7
17000.0	539.2	-11.9	11.9
17500.0	528.5	-13.2	13.2
18000.0	518.1	-14.5	14.5
3989.0	887.3	-3.6	0
4000.0	886.9	-2.8	
4500.0	870.3	-4.8	4.4
5000.0	854.1	-4.0	4.0
5500.0	838.3	-3.4	3.4
6000.0	822.7	-3.1	2.7
6500.0	807.4	-2.7	2.7
7000.0	792.4	-2.1	2.1
7500.0	777.6	-2.3	2.3
8000.0	763.1	-2.1	2.1
8500.0	748.9	-1.8	1.8
9000.0	734.9	-1.6	1.6
9500.0	721.1	-2.0	2.0
10000.0	707.7	-2.5	2.5
10500.0	694.3	-1.2	1.2
11000.0	681.2	-0.2	0.2
11500.0	668.4	-1.5	1.5
12000.0	655.8	-2.8	2.8
12500.0	642.3	-4.1	4.1
13000.0	631.0	-5.2	5.2
13500.0	618.9	-5.7	5.7
14000.0	607.0	-6.2	6.2
14500.0	595.3	-6.7	6.7
15000.0	583.9	-7.2	7.2
15500.0	572.4	-8.1	8.1
16000.0	561.1	-9.4	9.4
16500.0	550.0	-10.7	10.7
17000.0	539.2	-11.9	11.9
17500.0	528.5	-13.2	13.2
18000.0	518.1	-14.5	14.5
3989.0	887.3	-3.6	0
4000.0	886.9	-2.8	
4500.0	870.3	-4.8	4.4
5000.0	854.1	-4.0	4.0
5500.0	838.3	-3.4	3.4
6000.0	822.7	-3.1	2.7
6500.0	807.4	-2.7	2.7
7000.0	792.4	-2.1	2.1
7500.0	777.6	-2.3	2.3
8000.0	763.1	-2.1	2.1
8500.0	748.9	-1.8	1.8
9000.0	734.9	-1.6	1.6
9500.0	721.1	-2.0	2.0
10000.0	707.7	-2.5	2.5
10500.0	694.3	-1.2	1.2
11000.0	681.2	-0.2	0.2
11500.0	668.4	-1.5	1.5
12000.0	655.8	-2.8	2.8
12500.0	642.3	-4.1	4.1
13000.0	631.0	-5.2	5.2
13500.0	618.9	-5.7	5.7
14000.0	607.0	-6.2	6.2
14500.0	595.3	-6.7	6.7
15000.0	583.9	-7.2	7.2
15500.0	572.4	-8.1	8.1
16000.0	561.1	-9.4	9.4
16500.0	550.0	-10.7	10.7
17000.0	539.2	-11.9	11.9
17500.0	528.5	-13.2	13.2
18000.0	518.1	-14.5	14.5
3989.0	887.3	-3.6	0
4000.0	886.9	-2.8	
4500.0	870.3	-4.8	4.4
5000.0	854.1	-4.0	4.0
5500.0	838.3	-3.4	3.4
6000.0	822.7	-3.1	2.7
6500.0	807.4	-2.7	2.7
7000.0	792.4	-2.1	2.1
7500.0	777.6	-2.3	2.3
8000.0	763.1	-2.1	2.1
8500.0	748.9	-1.8	1.8
9000.0	734.9	-1.6	1.6
9500.0	721.1	-2.0	2.0
10000.0	707.7	-2.5	2.5
10500.0	694.3	-1.2	1.2
11000.0	681.2	-0.2	0.2
11500.0	668.4	-1.5	1.5
12000.0	655.8	-2.8	2.8
12500.0	642.3	-4.1	4.1
13000.0	631.0	-5.2	5.2
13500.0	618.9	-5.7	5.7
14000.0	607.0	-6.2	6.2
14500.0	595.3	-6.7	6.7
15000.0	583.9	-7.2	7.2
15500.0	572.4	-8.1	8.1
16000.0	561.1	-9.4	9.4
16500.0	550.0	-10.7	10.7
17000.0	539.2	-11.9	11.9
17500.0	528.5	-13.2	13.2
18000.0	518.1	-14.5	14.5

STATION ALTITUDE 3989.0 FEET MSL  
4 FEB. 69  
ASCENSION NO. 119

UPPER AIR DATA  
0658003906  
WHITE SANDS SITE

WSTM SITE COORDINATES  
E 488, 580 FEET  
N 185, 045 FEET

TABLE XIII (Cont)

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEPOINT DEGREES CENTIGRADE	REL.HUM. PERCENT			INDEX OF REFRACTION
			G/M	CUBIC METER	SOUND KNOTS	
18500.0	507.9	-15.7	-32.2	23.1	624.8	1.000155
19000.0	497.8	-17.0	-32.8	24.1	676.9	30.9
19500.0	488.0	-18.3	-32.8	26.9	666.8	30.6
20000.0	478.1	-19.6	-30.9	36.1	656.7	30.3
20500.0	468.4	-20.4	-27.3	54.4	645.3	29.3
21000.0	458.8	-21.5	-27.1	61.0	634.9	29.0
21500.0	449.4	-22.8	-28.2	62.4	625.0	27.6
22000.0	440.2	-24.2	-29.2	63.8	615.7	24.9
22500.0	431.1	-25.4	-30.2	65.0	606.2	26.2
23000.0	422.2	-25.5	-30.1	66.4	593.8	28.3
23500.0	413.4	-25.4	-29.6	68.4	581.1	30.6
24000.0	404.9	-26.3	-30.8	66.9	571.3	34.0
24500.0	396.3	-27.4	-32.1	65.2	561.7	25.1
25000.0	387.9	-28.7	-33.6	63.2	552.5	25.5
25500.0	379.6	-29.9	-35.1	61.2	543.5	42.4
26000.0	371.4	-31.1	-36.6	59.3	534.6	43.6
26500.0	363.5	-32.4	-38.1	57.3	525.9	37.3
27000.0	355.7	-33.6	-39.7	55.3	517.3	40.5
27500.0	348.1	-34.9	-41.2	53.4	508.9	40.5
28000.0	340.7	-36.1	-42.7	51.4	500.6	45.6
28500.0	333.4	-37.3	-44.2	49.4	492.5	47.9
29000.0	326.3	-38.6	-45.7	47.5	484.5	50.5
29500.0	319.2	-39.8	-47.2	46.1	476.6	53.3
30000.0	312.2	-41.2	-48.4	46.5	468.8	57.0
30500.0	305.2	-42.6	-49.6	45.8	461.2	56.0
31000.0	298.4	-44.0	-51.5	43.7**	453.6	57.5
31500.0	291.6	-45.4	-54.1	37.4**	446.1	57.5
32000.0	284.9	-46.9	-57.0	31.2**	438.7	53.0
32500.0	278.4	-48.4	-60.1	24.9**	431.5	53.2
33000.0	272.0	-49.8	-62.5	18.6**	424.4	53.4

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL  
4 FEB. 69 0800 HRS MST  
ASCENSION NO. 119

UPPER AIR DATA  
0658003906  
WHITE SANDS SITE

WEST SITE COORDINATES  
E 498.580 FEET  
N 185.045 FEET

TABLE XIII. (Cont.)

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE DEGREES CENTIGRADE	AIR DEMPPOINT PERCENT	REL. HUM. PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	WIND DIRECTION DEGREES (TAN) KNOTS	INDEX OF REFRACTION
33500.0	265.8	-51.3	-67.8	12.4**	417.5	580.0	246.4	1.000093
34000.0	259.8	-52.8	-73.8	6.1**	410.7	578.0	248.0	1.000091
34500.0	253.8	-54.2	0.0	-0.**	404.0	576.1	247.7	1.000090
35000.0	247.7	-55.5	0.0	-0.**	396.7	574.4	247.6	1.000088
35500.0	241.8	-56.8	0.0	-0.**	389.5	572.7	247.3	1.000087
36000.0	236.0	-58.1	0.0	-0.**	382.5	571.0	246.8	1.000085
36500.0	230.4	-59.4	0.0	-0.**	375.4	569.2	246.5	1.000084
37000.0	224.9	-60.7	0.0	-0.**	368.8	567.5	246.3	1.000082
37500.0	219.5	-62.0	0.0	-0.**	362.2	565.8	247.2	1.000081
38000.0	214.2	-63.3	0.0	-0.**	355.8	564.0	248.9	1.000079
38500.0	209.1	-63.4	0.0	-0.**	347.3	564.0	250.7	1.000077
39000.0	204.0	-62.5	0.0	-0.**	337.4	565.2	252.9	1.000075
39500.0	199.1	-61.5	0.0	-0.**	327.8	566.4	255.1	1.000073
40000.0	194.3	-60.6	0.0	-0.**	318.5	567.6	256.4	1.000071
40500.0	189.6	-59.7	0.0	-0.**	309.4	568.9	257.7	1.000069
41000.0	185.0	-59.1	0.0	-0.**	301.2	569.7	257.3	1.000067
41500.0	180.6	-58.7	0.0	-0.**	293.4	570.3	256.6	1.000065
42000.0	176.3	-58.2	0.0	-0.**	285.8	570.9	255.4	1.000064
42500.0	172.1	-57.8	0.0	-0.**	278.4	571.5	253.8	1.000062
43000.0	168.0	-57.3	0.0	-0.**	271.3	572.1	252.5	1.000060
43500.0	164.0	-56.9	0.0	-0.**	264.3	572.6	252.4	1.000059
44000.0	160.1	-56.4	0.0	-0.**	257.4	573.2	252.2	1.000057
44500.0	156.3	-56.9	0.0	-0.**	251.8	572.7	253.9	1.000056
45000.0	152.6	-57.3	0.0	-0.**	246.3	572.0	255.6	1.000055
45500.0	148.9	-57.8	0.0	-0.**	240.9	571.4	257.8	1.000054
46000.0	145.4	-58.3	0.0	-0.**	235.7	570.8	260.1	1.000052
46500.0	141.9	-58.7	0.0	-0.**	230.6	570.2	261.0	1.000051
47000.0	138.5	-59.2	0.0	-0.**	225.5	569.5	260.8	1.000050
47500.0	135.2	-59.7	0.0	-0.**	220.6	568.9	260.2	1.000049
48000.0	131.1	-60.2	0.0	-0.**	215.8	568.3	258.1	1.000048

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL  
4 FEB. 69 0800 HRS MST  
ASCENSION NO. 119

UPPER AIR DATA  
0658003906  
WHITE SANDS SITE

WSYM SITE COORDINATES  
E 498.380 FEET  
N 185.045 FEET

TABLE XIII (Cont.)

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	AIR DEGREES	TEMPERATURE NEWPOINT CENTIGRADE	REL.HUM. PERCENT	DENSITY GM/CUBIC METER	SOUND KNOTS	WIND DATA DIRECTION DEGREES(NT)	SPEED KNOTS	INDEX OF REFRACTION	
									INDEX OF REFRACTION	INDEX OF REFRACTION
48500.0	128.8	-60.6	211.1	567.6	256.0	70.5	1.000047			
49000.0	125.7	-61.1	206.5	567.0	254.0	66.6	1.000046			
49500.0	122.7	-61.6	202.1	566.4	252.0	63.0	1.000045			
50000.0	119.8	-61.8	197.4	566.1	250.7	59.6	1.000044			
50500.0	116.9	-59.1	190.3	569.6	249.8	56.9	1.000042			
51000.0	114.1	-58.0	185.4	570.1	249.4	53.6	1.000041			
51500.0	111.3	-59.5	181.4	569.2	250.0	51.9	1.000040			
52000.0	108.5	-60.2	177.6	568.2	250.6	50.2	1.000040			
52500.0	105.9	-60.9	173.8	567.3	250.6	50.2	1.000039			
53000.0	103.3	-61.6	170.1	566.3	250.6	50.2	1.000038			
53500.0	100.8	-62.3	166.5	565.4	250.6	50.3	1.000037			
54000.0	98.3	-63.0	163.0	564.5	250.6	50.3	1.000036			
54500.0	95.9	-63.7	159.6	563.5	250.2	50.0	1.000036			
55000.0	93.6	-64.4	156.2	562.6	249.0	49.1	1.000035			
55500.0	91.3	-65.1	152.9	551.6	247.6	48.2	1.000034			
56000.0	89.1	-65.8	149.7	560.7	246.4	47.8	1.000033			
56500.0	86.9	-66.5	146.5	559.7	245.0	47.3	1.000033			
57000.0	84.8	-67.2	143.4	558.7	244.4	46.7	1.000032			
57500.0	82.7	-67.9	140.4	557.8	244.3	46.1	1.000031			
58000.0	80.7	-68.6	137.4	556.8	245.1	45.6	1.000031			
58500.0	78.7	-69.3	134.5	555.9	247.3	45.7	1.000030			
59000.0	76.7	-69.6	131.4	555.5	248.6	45.9	1.000029			
59500.0	74.8	-69.7	128.1	555.4	252.4	47.2	1.000029			
60000.0	72.9	-69.7	124.9	555.4	255.3	48.5	1.000028			
60500.0	71.1	-69.8	121.8	555.3	257.2	49.9	1.000027			
61000.0	69.3	-69.7	118.7	555.4	259.0	51.4	1.000026			
61500.0	67.6	-69.4	115.7	555.8	260.7	52.6	1.000026			
62000.0	66.0	-69.1	112.7	556.3	262.3	54.0	1.000025			
62500.0	64.4	-68.8	109.8	556.7	264.0	55.2	1.000024			
63000.0	62.8	-68.5	106.9	557.1	265.4	55.8	1.000024			

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE HAS BEEN USED IN THE INTERPOLATION

STATION ALTITUDE 3989.0 FEET MSL  
4 FEB. 69 0800 HRS MST  
ASCENSION NO. 119

UPPER AIR DATA  
0658003906  
WHITE SANDS SITE

WSTM SITE COORDINATES  
E 488.580 FEET  
N. 185.045 FEET

TABLE XIII (Cont.)

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEPOINT DEGREES CENTIGRADE	REL. HUM. PERCENT	WIND DATA		INDEX OF REFRACTION
				GN/CUBIC METER	SPEED OF DIRECTION DEGREES(EN)	
63500.0	61.3	-68.2	-0.	104.2	557.5	56.2
64000.0	59.8	-67.8	-0.	102.5	557.9	56.3
64500.0	58.4	-67.5	-0.	98.9	558.3	53.8
65000.0	56.9	-67.2	-0.	96.3	558.8	51.3
65500.0	55.6	-66.9	-0.	93.9	559.2	47.8
66000.0	54.2	-66.6	-0.	91.4	559.6	42.7
66500.0	52.9	-66.3	-0.	89.1	560.0	37.5
67000.0	51.6	-66.0	-0.	86.8	560.4	33.3
67500.0	50.3	-65.7	-0.	84.5	560.8	29.3
68000.0	49.1	-65.4	-0.	82.4	561.2	25.4
68500.0	47.9	-65.1	-0.	80.2	561.6	25.0
69000.0	46.8	-64.8	-0.	78.2	562.1	24.5
69500.0	45.6	-64.5	-0.	76.2	562.5	25.8
70000.0	44.5	-64.2	-0.	74.2	562.9	30.5
70500.0	43.4	-63.9	-0.	72.3	563.3	35.2
71000.0	42.4	-63.6	-0.	70.4	563.7	39.0
71500.0	41.3	-63.3	-0.	68.6	564.1	42.4
72000.0	40.3	-63.0	-0.	66.9	564.5	45.8
72500.0	39.4	-62.6	-0.	65.1	564.9	45.0
73000.0	38.4	-62.3	-0.	63.5	565.4	44.1
73500.0	37.5	-62.0	-0.	61.8	565.8	42.5
74000.0	36.6	-61.7	-0.	60.2	566.2	39.5
74500.0	35.7	-61.4	-0.	58.7	566.6	31.9
75000.0	34.8	-61.1	-0.	57.2	567.0	30.2.5
75500.0	33.9	-60.8	-0.	55.7	567.4	30.4.8
76000.0	33.1	-60.5	-0.	54.3	567.8	307.1
76500.0	32.3	-60.2	-0.	52.9	568.2	308.1
77000.0	31.5	-59.9	-0.	51.5	568.6	302.5
77500.0	30.8	-59.6	-0.	50.2	569.0	296.9
78000.0	30.0	-59.3	0.	48.9	569.4	292.1

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MST  
4 FEB. 65 0800 HRS MST  
ASCENSION NO. 119

UPPER AIR DATA  
0658003905  
WHITE SANDS SITE

WSTM SITE COORDINATES  
E 488.580 FEET  
N 185.045 FEET

TABLE XIII (Cont)

GEOMETRIC ALTITUDE NSL FEET	PRESSURE MILLIBARS	AIR DEPOINT DEGREES CENTIGRADE	REL. HUM. PERCENT	DENSITY GM/CUBIC METER	SPEED OF SOUND KNOTS	DIRECTION DEGREES (TN)	WIND DATA SPEED KNOTS	INDEX OF REFRACTION
78500.0	29.3	-59.0	0.	47.6	569.8	290.8	27.2	1.000011
79000.0	28.6	-58.7	0.	46.4	570.3	289.5	28.1	1.000010
79500.0	27.9	-58.4	0.	45.2	570.7	288.5	28.9	1.000010
80000.0	27.2	-58.1	0.	44.1	571.1	288.5	29.1	1.000010
80500.0	26.5	-57.7	0.	42.9	571.5	288.5	29.3	1.000010
81000.0	25.9	-57.4	0.	41.8	571.9	289.0	29.5	1.000009
81500.0	25.3	-57.1	0.	40.7	572.3	291.3	29.9	1.000009
82000.0	24.6	-56.8	0.	39.7	572.7	293.5	30.4	1.000009
82500.0	24.0	-56.5	0.	38.7	573.1	295.4	31.0	1.000009
83000.0	23.5	-56.2	0.	37.7	573.6	294.8	33.2	1.000008
83500.0	22.9	-55.8	0.	36.8	574.0	294.1	35.4	1.000008
84000.0	22.4	-55.4	0.	35.9	574.5	293.5	37.6	1.000008
84500.0	21.9	-55.1	0.	35.0	575.0	294.3	37.5	1.000008
85000.0	21.4	-54.7	0.	34.1	575.5	295.5	36.8	1.000008
85500.0	20.9	-54.4	0.	33.2	576.0	296.6	36.0	1.000007
86000.0	20.4	-54.0	0.	32.4	576.4	297.6	35.5	1.000007
86500.0	19.9	-53.6	0.	31.6	576.9	298.2	35.3	1.000007
87000.0	19.4	-53.3	0.	30.8	577.4	298.8	35.1	1.000007
87500.0	19.0	-52.9	0.	30.0	577.9	299.4	34.9	1.000007
88000.0	18.5	-52.5	0.	29.3	578.3	299.9	34.8	1.000007
88500.0	18.1	-52.5	0.	28.6	578.4	300.5	34.6	1.000006
89000.0	17.7	-52.5	0.	27.9	578.5	301.1	34.4	1.000006
89500.0	17.3	-52.4	0.	27.3	578.5	301.8	34.3	1.000006
90000.0	16.9	-52.4	0.	26.7	578.5	303.0	34.5	1.000006
90500.0	16.5	-52.4	0.	26.0	578.6	304.1	34.7	1.000006
91000.0	16.1	-52.4	0.	25.4	578.6	305.2	34.9	1.000006
91500.0	15.8	-52.3	0.	24.9	578.6	306.6	34.7	1.000006
92000.0	15.4	-52.3	0.	24.3	578.6	312.2	34.8	1.000005
92500.0	15.0	-52.3	0.	23.7	578.7	315.8	34.5	1.000005
93000.0	14.7	-52.3	0.	23.2	578.7	317.9	34.5	1.000005

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL  
4 FEB. 69 0800 HRS MST  
ASCENSION NO. 119

UPPER AIR DATA  
0658033906  
WHITE SANDS SITE

TABLE XIII. (Cont.)

GEOMETRIC PRESSURE ALTITUDE MSL FEET	PRESSURE MILLIBARS	TEMPERATURE AIR DEPOINT DEGREES CENTIGRADE	REL. HUM. PERCENT	WIND DATA		INDEX OF REFRACTION
				DENSITY GM/CUBIC METER	SPEED KNOTS	
93500.0	14.3	-52.2	-0-	22.6	578.7	317.5
94000.0	14.0	-52.2	-0-	22.1	578.8	317.1
94500.0	13.7	-52.2	-0-	21.6	578.8	316.7
95000.0	13.4	-52.2	-0-	21.1	578.8	316.5
95500.0	13.1	-52.1	-0-	20.6	578.9	316.5
96000.0	12.8	-52.1	-0-	20.1	578.9	316.4
96500.0	12.5	-52.1	-0-	19.7	578.9	315.9
97000.0	12.2	-52.1	-0-	19.2	579.0	315.3
97500.0	11.9	-52.0	-0-	18.8	579.0	314.6
98000.0	11.6	-52.0	-0-	18.3	579.0	314.2
98500.0	11.4	-51.7	-0-	17.9	579.5	315.9
99000.0	11.1	-51.0	-0-	17.4	580.3	317.8
99500.0	10.8	-50.4	-0-	17.0	581.2	319.8
100000.0	10.6	-49.7	-0-	16.5	582.0	323.3
100500.0	10.4	-49.1	-0-	16.1	582.9	329.7
101000.0	10.1	-48.4	-0-	15.7	583.7	336.1
101500.0	9.9	-47.8	-0-	15.3	584.5	342.5
102000.0	9.7	-47.2	-0-	14.9	585.3	347.6
102500.0	9.5	-46.6	-0-	14.6	586.0	352.4
103000.0	9.3	-46.0	-0-	14.2	586.8	357.2
103500.0	9.0	-45.4	-0-	13.8	587.6	362.5
104000.0	8.9	-44.8	-0-	13.5	588.3	370.0
104500.0	8.7	-44.2	-0-	13.2	589.1	377.0
105000.0	8.5	-43.7	-0-	12.9	589.9	384.2
105500.0	8.3	-43.1	-0-	12.5	590.6	392.5
106000.0	8.1	-42.5	-0-	12.2	591.4	400.7
106500.0	7.9	-41.9	-0-	11.9	592.2	408.5
107000.0	7.7	-41.3	-0-	11.6	592.9	20.5
107500.0	7.6	-40.7	-0-	11.3	593.7	1.000003
108000.0	7.4	-40.1	-0-	11.1	594.4	1.000002

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

STATION ALTITUDE 3989.0 FEET MSL  
4 FEB. 69 0800 HRS MST  
ASCENSION NO. 119

UPPER AIR DATA  
0658003906  
WHITE SANDS SITE

WSTM SITE COORDINATES  
E 488,580 FEET  
N 185,045 FEET

TABLE XIII (Cont)

GEOMETRIC ALTITUDE MSL FEET	PRESSURE MILLIBARS	AIR DEMPNT DEGREES	TEMPERATURE CENTIGRADE	REL.HUM. PERCENT	WIND DATA		INDEX OF REFRACTION
					METER KNOTS	GM/CUBIC SOUND DEGREES(1M)	
108500.0	7.2	-39.5	0.	-0.	**	10.8	595.2
109000.0	7.1	-38.9	0.	-0.	**	10.5	596.0
109500.0	6.9	-38.3	0.	-0.	**	10.3	596.7
110000.0	6.8	-37.7	0.	-0.	**	10.0	597.5
110500.0	6.6	-37.1	0.	-0.	**	9.8	598.2
111000.0	6.5	-35.5	0.	-0.	**	9.5	599.0

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

SATION ALTITUDE 3989.0 FEET MSL  
4 FEB. 65 0800 HRS MST  
ASCENSION NO. 119

MANDATORY LEVELS  
06580003904  
WHITE SANDS SITE

WSTA SITE COORDINATES  
E 498.589 FEET  
N 395.045 FEET

TABLE XIV

PRESSURE MILLIBARS	GEOPOTENTIAL FEET	TEMPERATURE DEGREES CENTIGRADE	AIR DEMPNT PERCENT	WIND DATA	
				DIRECTION DEGREES (TN)	SPEED KNOTS
850.0	5120.	4.3	-11.6	30.	5.2
800.0	6744.	2.9	-10.0	38.	12.4
750.0	8455.	1.8	-8.8	45.	15.4
700.0	10282.	1.7	-11.9	36.	13.5
650.0	12224.	-3.4	-13.5	46.	16.9
600.0	14287.	-6.5	-21.4	30.	24.4
550.0	16503.	-10.7	-30.0	19.	29.6
500.0	18880.	-16.7	-32.7	24.	30.9
450.0	21447.	-22.8	-28.1	62.	26.9
400.0	24255.	-26.9	-31.5	66.	39.1
350.0	27367.	-34.5	-40.8	34.	52.8
300.0	30836.	-43.6	-50.9	45.**	54.1
250.0	34756.	-55.1	0.	-0.**	247.6
200.0	39319.	-61.7	0.	-0.**	254.7
175.0	42060.	-58.1	0.	-0.**	254.9
150.0	45260.	-57.7	0.	-0.**	257.1
125.0	49004.	-61.2	0.	-0.**	253.5
100.0	53562.	-62.5	0.	-0.**	250.6
80.0	58011.	-68.9	0.	-0.**	245.0
70.0	60623.	-69.8	0.	-0.**	258.2
60.0	63649.	-67.9	0.	-0.**	267.6
50.0	67266.	-65.6	0.	-0.**	280.3
40.0	71746.	-62.8	0.	-0.**	278.5
30.0	77609.	-59.3	0.	-0.**	292.5
25.0	81376.	-57.0	0.	-0.**	292.2
20.0	86046.	-53.7	0.	-0.**	298.1
15.0	92143.	-52.3	0.	-0.**	316.2
10.0	100783.	-48.1	0.	-0.**	339.5
7.0	108660.	-38.6	0.	-0.**	39.9

\*\* AT LEAST ONE ASSUMED RELATIVE HUMIDITY VALUE WAS USED IN THE INTERPOLATION.

RELEASE TIME (MST)	SECOND-STAGE IMPACT DISPLACEMENT IN MILES DUE TO WIND								AZI-MUTH (DEGREES)	THEORETICAL IMPACT FROM LAUNCHER (IN MILES)
	9-216 FT		216-4100 FT		4100-67300 FT		TOTAL			
RAWIN- SONDE	PIBAL	N-S	E-W	N-S	E-W	N-S	E-W	RANGE	N-S	E-W
0500	0600	5.7N	1.3E	2.1N	5.1E	6.2S	26.3W	1.6N	19.9W	358.2
0500	0630	6.2N	1.5E	2.6N	2.8E	6.2S	26.3W	2.6N	22.0W	356.5
0500	0700	4.4N	2.7E	0.6N	4.5E	6.2S	26.3W	1.2S	19.1W	358.9
0500	0715	3.7N	1.5E	0.5S	3.3E	6.2S	26.3W	3.0S	21.5W	356.7
0500	0730	3.3N	0.4W	0.1N	3.4E	6.2S	26.3W	2.8S	23.3W	355.1
0500	0745	1.9N	0.3W	1.0S	2.7E	6.2S	26.3W	5.3S	23.9W	354.4
0500	0800	3.5N	1.3E	1.7S	3.6E	6.2S	26.3W	4.4S	21.4W	356.7
*0800	*0811	3.7N	1.2E	0.5N	2.5E	5.7S	26.4W	1.5S	22.7W	355.7

AZI-MUTH (DEGREES)	MILES FROM LAUNCHER
LAUNCHER SETTING (ELEVATION 83.9 DEGREES QE)	
NO WIND IMPACT	018.0
PREDICTED SECOND-STAGE IMPACT	015.0
SECOND-STAGE IMPACT, RADAR TRACK	357.0
PREDICTED BOOSTER IMPACT	035.0
ACTUAL BOOSTER IMPACT	N/A

\*Post-Shoot Data

TABLE XV. IMPACT PREDICTION DATA  
NIKE-HYDAG STV-82

RELEASE TIME (EST)	PIBAL	SECOND-STAGE IMPACT DISPLACEMENT, IN MILES DUE TO WIND								AZI-MUTH (DEG- REES)	ALTITUDE FROM LAUNCHER (IN' MILES)	METEORITICAL IMPACT N-A
		15-216 FT		216-4160 FT		4160-73300 FT		TOTAL				
RAWIN- SONDE	N-S	E-W	N-S	E-W	N-S	E-W	N-S	E-W	RANGE	N-A	M-A	
0800	0800	2.6N	0.9E	3.0S	3.7E	5.4S	26.1W	5.8S	23.3W	356.3	61.2	61.1N
0800	0811	2.7N	0.9E	1.2S	2.6E	5.4S	28.1W	3.9S	24.4W	355.6	63.2	63.0N
0800	0820	2.0N	0.4E	1.1S	3.4S	5.4S	28.1W	4.5S	24.3W	355.6	62.6	62.4N
0800	0830	2.9N	0.8E	0.1S	4.1E	5.4S	28.1W	2.6S	23.2W	356.7	64.4	64.3N
0800	0845	3.0N	0.7E	0.3S	3.2E	5.4S	29.1W	2.7S	24.2W	355.8	64.4	64.2N
0800	0850	3.5N	1.4E	0.9N	3.9E	5.4S	28.1W	1.0S	22.8W	357.1	66.0	65.9N
0800	*0900	2.8N	1.4E	0.0	3.5E	5.4S	28.1W	2.6S	23.2W	356.7	64.4	64.3N

AZI-MUTH (DEG- REES)	MILES FROM LAUNCHER N-S	MILES FROM LAUNCHER E-W
LAUNCHER SETTING (ELEVATION 85.1 DEGREES QE)		
NO WIND IMPACT	020.0	71.2
PREDICTED SECOND-STAGE IMPACT:	016.3	69.7
SECOND-STAGE IMPACT, RADAR TRACK	350.0	70.0
PREDICTED BOOSTER IMPACT	000.6	63.3
ACTUAL BOOSTER IMPACT	N/A	N/A

TABLE XVI. IMPACT PREDICTION DATA  
NIKE-HYDAC STV-83

\*Post-Shoot Data

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16. ABSTRACT  Meteorological data gathered for the launching of two Nike-Hydac Missiles, STV-82 and STV-83, are presented for the Space and Missile Systems Organization, Holloman Air Force Base, New Mexico, and for ballistic studies. The data appear, along with calculated ballistic data, in tabular form.		

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